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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TODD R. SALAMON

Appeal 2015-003117¹
Application 12/577,148²
Technology Center 3700

Before MICHAEL W. KIM, PHILIP J. HOFFMANN, and
ROBERT J. SILVERMAN, *Administrative Patent Judges*.

HOFFMANN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the rejection of claims 1–10, 23–25, and 30–33. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

¹ Our decision references Appellant’s Specification (“Spec.,” filed Oct. 9, 2009), Appeal Brief (“Appeal Br.,” filed Sept. 9, 2014), and Reply Brief (“Reply Br.,” filed Jan. 12, 2015), as well as the Examiner’s Answer (“Answer,” mailed Nov. 10, 2014).

² According to Appellant, “[t]he real parties in interest are . . . Lucent Technologies Inc., its successor entity, Alcatel-Lucent USA Inc., and its parent company Alcatel-Lucent.” Appeal Br. 3.

According to Appellant, the “invention generally relates to thermal interface devices, systems that include thermal interface devices, and methods that include forming thermal interfaces between objects.” Spec.

¶ 1. Claims 1 and 23 are the only independent claims. *See* Appeal Br., Claims App. We reproduce both claims, below, as representative of the appealed claims.

1. A device, comprising:

an enclosure;

a matrix material;

a plurality of particles formed of a material having substantial bulk thermal conductivity of at least about one watt per meter-Kelvin (1 W/[mK]) at a standardized measurement temperature of about 68°F;

the plurality of particles being dispersed in the matrix material and being encapsulated in the enclosure;

wherein upon deformation, the enclosure is configured to allow a portion of the matrix material to escape from the enclosure while retaining at least a portion of the plurality of particles within the enclosure.

23. A system, comprising:

an enclosure having first and second exterior surfaces and encapsulating a plurality of particles formed of a material having substantial bulk thermal conductivity of at least about one watt per meter-Kelvin (1 W/[mK]) at a standardized measurement temperature of about 68°F and being dispersed in a matrix material; and

a first object having a first object surface and a second object having a second object surface, the enclosure being located between the objects with the first exterior surface of the enclosure facing toward the first object surface and with the second exterior surface of the enclosure facing toward the second object surface;

wherein the enclosure has through-pores communicating between an interior of the enclosure and an exterior of the enclosure, at least a portion of the plurality of particles having diameters being larger than a maximum diameter of the through-pores.

Id.

REJECTIONS AND PRIOR ART³

The Examiner rejects claims 1–5, 8, 23, 24, and 30–32 under 35 U.S.C. § 103(a) as unpatentable over Chiu (US 6,150,195, iss. Nov. 21, 2000), Mann (US 6,404,634 B1, iss. June 11, 2002), and Norell (US 5,561,590, iss. Oct. 1, 1996).

The Examiner rejects claims 6 and 33 under 35 U.S.C. § 103(a) as unpatentable over Chiu, Mann, Norell, and Deeny (US 5,783,862, iss. July 21, 1998).⁴

The Examiner rejects claims 7, 10, and 25 under 35 U.S.C. § 103(a) as unpatentable over Chiu, Mann, Norell, and McCullough (US 6,367,541 B2, iss. Apr. 9, 2002).⁵

³ The Examiner withdraws an indefiniteness rejection. Answer 12.

⁴ Inasmuch as these dependent claims depend from independent claims 1 and 23, which are rejected based on Norell, we treat the dependent claims also as rejected based on Norell.

⁵ Inasmuch as these dependent claims depend from independent claims 1 and 23, which are rejected based on Norell, we treat the dependent claims also as rejected based on Norell.

The Examiner rejects claim 9 under 35 U.S.C. § 103(a) as unpatentable over Chiu, Mann, Norell, and Sung (US 2005/0250250 A1, pub. Nov. 10, 2005).⁶

ANALYSIS

With respect to the rejection of independent claim 1, we will assume, *arguendo*, that Appellant is correct in each of the following: the claim recitation of “wherein upon deformation, the enclosure is configured to allow a portion of the matrix material to escape from the enclosure while retaining at least a portion of the plurality of particles within the enclosure” (Appeal Br., Claims App.) is not a conditional limitation (*see, e.g.*, Reply Br. 2; *see also, e.g.*, Appeal Br. 7–9); the claim recitation “the plurality of particles being dispersed in the matrix material and being encapsulated in the enclosure” (Appeal Br., Claims App.) requires that the matrix material is enclosed in the enclosure (*see, e.g.*, Reply Br. 2–3; *see also, e.g.*, Appeal Br. 9–12); and neither Chiu nor Mann discloses a matrix material enclosed in an enclosure (*see, e.g.*, Reply Br. 4). Regardless, the Examiner finds that

Norell, in column 2, lines 62[–]66 explicitly discloses that the compliant body (12) is represented with zig-zagged lines that represent the body itself, and the spaces between the lines represent the microscopic voids which hold the liquid metal alloy. Therefore, the structure of Norell also discloses at least some of the matrix material being enclosed by the compliant body 12 of Norell.

⁶ Inasmuch as this dependent claim depends from independent claim 1, which is rejected based on Norell, we treat the dependent claim also as rejected based on Norell.

Answer 15. Based on our review, we determine that the Examiner's finding is adequate. In particular, we note that this portion of Norell states that "the microscopic voids . . . hold the liquid metal alloy" (i.e., the liquid metal alloy is held in the voids within the enclosure), thereby meeting the specific requirement that the material is, in fact, enclosed in an enclosure. Norell col. 2, ll. 64–66. Further, Appellant does not submit arguments addressing this finding to the extent necessary to persuade us that the Examiner errs or that Norell otherwise does not disclose a material enclosed in an enclosure.

Finally, we will also assume, *arguendo*, that Appellant is correct that neither Chiu nor Mann discloses the claim limitation of "the enclosure is configured to allow a portion of the matrix material to escape from the enclosure while retaining at least a portion of the plurality of particles within the enclosure." Appeal Br., Claims App.; *see also* Reply Br. 4. The Examiner does find, however, that "Norell teaches the use of a compliant body (12) between a heat source (11) and a heat sink (15) and depending on how much the elements are compressed the compliant body (12) is squeezed and a liquid metal alloy (12a) is intentionally squeezed out of the compliant body (12)." Answer 3–4. Consistent with the Examiner's finding, Norell's Figures 2A–2D show compliant body 12 compressed different amounts, which results in different amounts of liquid metal alloy 12a escaping from and being retained in body 12. *See* Norell Figs. 2A–2D. As a result, we find that Norell does teach an enclosure that allows a portion of the material to escape while retaining a portion of the material, contrary to Appellant's argument.

Based on the foregoing, we sustain the rejection of independent claim 1. Further, inasmuch as Appellant argues the rejections of dependent

claims 2–10 are erroneous because the rejection of claim 1 is erroneous, we sustain the rejections of claims 2–10.

With respect to the rejection of independent claim 23, however, the Examiner does not find that any reference discloses the claim recitation of “the enclosure has through-pores communicating between an interior of the enclosure and an exterior of the enclosure, at least a portion of the plurality of particles having diameters being larger than a maximum diameter of the through-pores.” Appeal Br., Claims App.; *see also* Answer 6–8. As discussed in detail below, none of the Examiner’s reasons for modifying the references applied in the rejection is adequate, and, thus, we do not sustain the rejection of claim 23.

Specifically, we disagree with the Examiner that

[i]t would have been an obvious matter of design choice to further modify . . . Chiu by having at least a portion of the plurality of particles having diameters being larger than a maximum diameter of the through-pores, since [Appellants] ha[ve] not disclosed that having at least a portion of the plurality of particles having diameters being larger than a maximum diameter of the through-pores solves any stated problem or is for any particular purpose and it appears that the device would perform equally well with the plurality of particles having diameters larger or smaller than a maximum diameter of the through-pores.

Answer 7–8. Conversely, we agree with Appellant that the Specification describes reasons for sizing a portion of the plurality of particles to have diameters larger than the maximum diameter of the enclosure’s through-pores—i.e., to retain, after deformation of the enclosure, a majority of the particles within the enclosure while permitting some of the particles and the matrix material to escape from the enclosure. Appeal Br. 12–13 (citing Specification ¶ 35).

The Examiner reasons that

it would have been an obvious matter of design choice to further modify the device of Chiu by having the diameters of at least a portion of the plurality of particles being larger than a maximum diameter of the through-pores, in order to prevent the particles from falling off while the device is being assembled.

Answer 7–8. The Examiner provides no evidence, such as a citation to Chiu or otherwise, showing that increasing the diameter as proposed would “prevent the particles from falling off while the device is being assembled.” Thus, we determine that this reasoning given by the Examiner is insufficient to establish that sizing a portion of the plurality of particles to have diameters larger than the maximum diameter of the enclosure’s through-pores is an obvious variation of Chiu.

Finally, the Examiner reasons that

as discussed . . . in the rejection of claim 9, a person skilled in the art would have found [it] obvious to have the plurality of particles to include first particles having a first diameter and second particles having a second diameter being smaller than the first diameter, in view of the teachings of Sung, in order to improve the conductive heat transfer in the overall device, since the smaller diameter particles can fill voids that the larger particle diameters cannot fill.

Answer 17. First, the Examiner’s rejection of claim 23 is not based on Sung, and, thus, it is not clear how Sung may provide the rationale to modify the other references actually used in the rejection of claim 23. Further, we note that the Examiner does not establish that Sung teaches anything other than particle diameters of different sizes, as opposed to particles having diameters bigger and smaller than through-pores of an enclosure. Therefore, even if the Examiner had rejected claim 23 based on Sung, the Examiner’s reasoning would have been insufficient to establish that sizing a portion of

the plurality of particles to have diameters larger than the maximum diameter of the enclosure's through-pores is an obvious variation of Chiu and the other references used in the rejection.

Based on the foregoing, we do not sustain the rejection of independent claim 23. Further, inasmuch as the Examiner does not establish that any other reference remedies the deficiency in the rejection of claim 23, we do not sustain any of the rejections of dependent claims 24, 25, and 30–33.

DECISION

We AFFIRM the Examiner's obviousness rejections of claims 1–10.

We REVERSE the Examiner's obviousness rejections of claims 23–25, and 30–33.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART